

# Management of a severely resorbed mandibular ridge with the neutral zone technique

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## Abstract

The loose and unstable lower complete denture is one of the most common problems faced by denture patients. One of the methods used to solve this problem is the neutral zone technique. The neutral zone is the area where the displacing forces of the lips, cheeks, and tongue are in balance. It is in this zone that the natural dentitions lie and this is where the artificial teeth should be positioned. This area of minimal conflict may be located by using the neutral zone technique. The artificial teeth can then be set up in the correct positions.

**Keywords:** Denture stability, low fusing compound, neutral zone, resorbed mandibular ridge

## Introduction

Complete dentures are primarily mechanical devices but since they function in the oral cavity, they must be fashioned so that they are in harmony with the normal neuromuscular function. All oral functions, such as speech, mastication, swallowing, smiling, and laughing, involve the synergistic actions of the tongue, lips, cheeks, and floor of the mouth which are very complex and highly individual. Failure to recognize the cardinal importance of tooth position and flange form and contour often results in dentures which are unstable and unsatisfactory, even though they were skillfully designed and expertly constructed. The coordination of complete dentures with the neuromuscular function is the foundation of successful, stable dentures.<sup>[1]</sup> When all of the natural teeth have been lost, there exists within the oral cavity a void which is the potential denture space. The neutral zone is the potential space between the lips and cheeks on one side and the tongue on the other, that area or position where the forces between the tongue and cheeks or lips are equal.<sup>[2]</sup>

Incorrect tooth placement and arbitrary shaping of the polished surfaces may have an adverse effect on the success of the prosthesis. This is particularly true for patients with reduced mandibular residual ridges, yielding flat or concave foundations due to severe bone resorption. The unstable lower complete denture is a continuing problem for our profession.<sup>[3]</sup>

Many materials have been suggested for shaping the neutral

zone: modeling plastic impression compound, soft wax, a polymer of dimethyl siloxane filled with calcium silicate, silicone, and tissue conditioners and resilient lining materials.

Many techniques have also been suggested using the materials in conjunction with movements including sucking, grinning and whistling, and pursing the lips. The swallowing/modeling plastic impression compound technique located the neutral zone, using swallowing as the principle modeling function.<sup>[4]</sup>

## Case Report

Here in this case report the management of a mandibular resorbed ridge with neutral zone technique using low fusing compound has been described.

A female patient aged about 45 years reported with a completely edentulous and severely resorbed mandibular ridge [Figure 1].

Primary impressions of the upper and lower jaws were made with impression compound and the model was poured. Maxillary secondary impression was made and a wax rim and a lower special tray were constructed. The special tray was a plate of acrylic adapted to the lower ridge, without a handle, with spurs or fins projecting upward toward the upper arch [Figure 2]. These help with the retention of the low fusing compound. The lower special tray with the softened low fusing compound was placed in the patient's mouth; this tray was very carefully adjusted in the mouth to be sure that it was not overextended and remained stable during opening, swallowing, and speaking. The patient was then asked to talk, swallow, drink some water, etc. After 5–10 min, the set impression was removed from the mouth and examined. The internal and external muscle groups have been brought into play, moving them through their respective action paths. In doing so, reciprocating pressures have been

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**Figure 1:** Resorbed mandibular ridge



**Figure 2:** Lower special tray with spurs or fins projecting upward



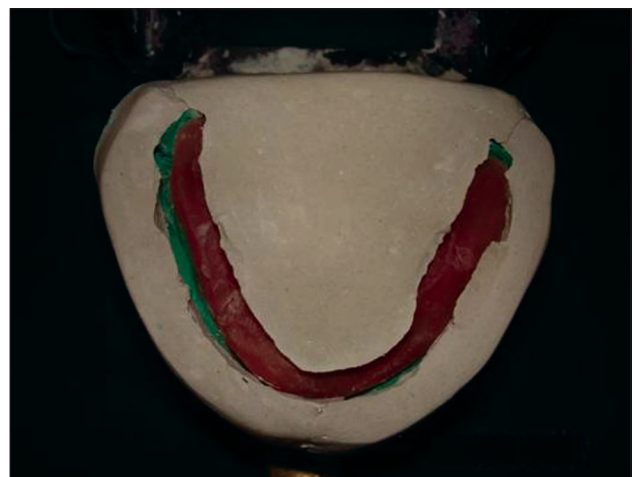
**Figure 3:** Notch is cut in the lingual center section, and two notches were made on each of the buccal sides



**Figure 4:** Shape of the denture is permanently registered in the plaster index



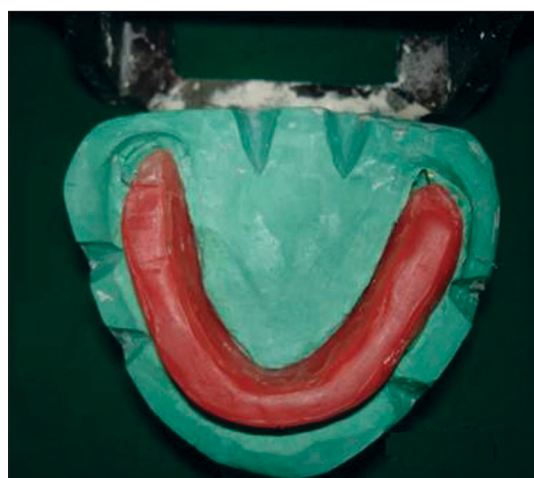
**Figure 5:** Bare acrylic resin denture base



**Figure 6:** Bare acrylic resin denture base with the index



**Figure 7:** Labial and lingual indices on the occlusal surface



**Figure 8:** Lower occlusion rim



**Figure 9:** Lower teeth arrangement in the neutral zone



**Figure 10:** Wax trial dentures



**Figure 11:** Denture insertion

exerted upon the compound, which had gradually molded into a state of neutral balance and become centrally inert in relation to all of the complex forces acting upon it. After a tentative vertical dimension and centric relation have been established, the final impression was made with a closed-

mouth procedure. Only when the final impressions were completed were the occlusal vertical dimension and centric relation finally determined.

#### The Plaster Index

Artificial stone is poured into the final impression. The base is then set down on a platter-shaped portion of the mix which extends at least 1 inch beyond the borders of the acrylic resin base. Before the stone sets completely, it is notched. One notch is cut in the lingual center section, and two notches are made on each of the buccal sides, one in the cuspid and one in the molar region [Figure 3]. The notches are made quickly. The stone cast, the acrylic resin base, and the compound are immersed together in cold water to avoid the effects of the chemical heat of the setting stone. The stone is coated with a separating medium when it is set hard, and the compound is covered with a 1-inch-thick layer of a plaster which is worked into the notches of the base. This is done in two sections, leaving a narrow dividing line of the compound at the occlusal and incisal edges of the pattern so



that the lingual and buccal sections of the plaster index do not quite meet. The heat of setting is controlled by placing it in a pan of cold water. When this plaster has hardened, the index can be split at the median line on the labial side. The buccal and labial portion may be removed till two sections. The lingual portion may be removed as a single piece. The shape of the denture is now permanently registered in this plaster index [Figure 4].

The low fusing compound is now destroyed down to the bare acrylic resin [Figure 5]. The plaster index is soaked in hot water and the excess is blown off. The index is then coated with a light mineral oil and assembled with the acrylic resin base in position [Figure 6]. The pink baseplate wax is slowly melted in a ladle and poured into the index through the space between the labial and lingual indices on the occlusal surface [Figure 7]. Then the entire assembly is immersed in cold water. When the index is opened, a hard wax duplicate of the low fusing compound has been formed. This is easily handled, and being attached to the acrylic resin base, it becomes the lower occlusion rim [Figure 8].

#### Arrangement of Teeth

All of the lower teeth are set first [Figure 9]. This is done by removing just enough wax to set one tooth at a time, constantly checking its position with the index. When all of the lower teeth have been set, the upper teeth are arranged.

#### Completion of the Dentures

The wax trial dentures [Figure 10] are tried in the mouth to

check the appearance and occlusion.

The upper denture is finished in the usual manner. A stone cast is poured carefully into the impression surface of the acrylic resin base of the lower trial denture. This is then flaked in the usual way. After the flask has been separated and the wax removed, the acrylic resin base is softened by directing a Bunsen flame against it. The resin base is then removed from the flask and the mold is packed with the all new denture base material. This will avoid warpage of the original base during processing. The finished lower denture must be polished very lightly, and with extreme care finally the denture insertion [Figure 11] and postinsertion instructions were given.

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